

Quiz 3: Section 7.1, Problem 14

Calculate S_4 given by Simpson's Rule for:

$$\int_3^5 (9 - x^2) dx$$

Note: This question is not asking to compute the integral above!

We have $\Delta x = \frac{5-3}{4} = \frac{1}{2}$ so

$$\begin{aligned} S_4 &= \frac{1}{3} \frac{1}{2} \left(f(3) + 4f\left(\frac{7}{2}\right) + 2f(4) + 4f\left(\frac{9}{2}\right) + f(5) \right) \\ &= \frac{1}{6} \left((9 - 3^2) + 4 \left(9 - \left(\frac{7}{2}\right)^2 \right) + 2(9 - 4^2) + 4 \left(9 - \left(\frac{9}{2}\right)^2 \right) + (9 - 5^2) \right) \\ &= -\frac{44}{3} \end{aligned}$$